



Course Selection Counselling Day

22 Aug 2024

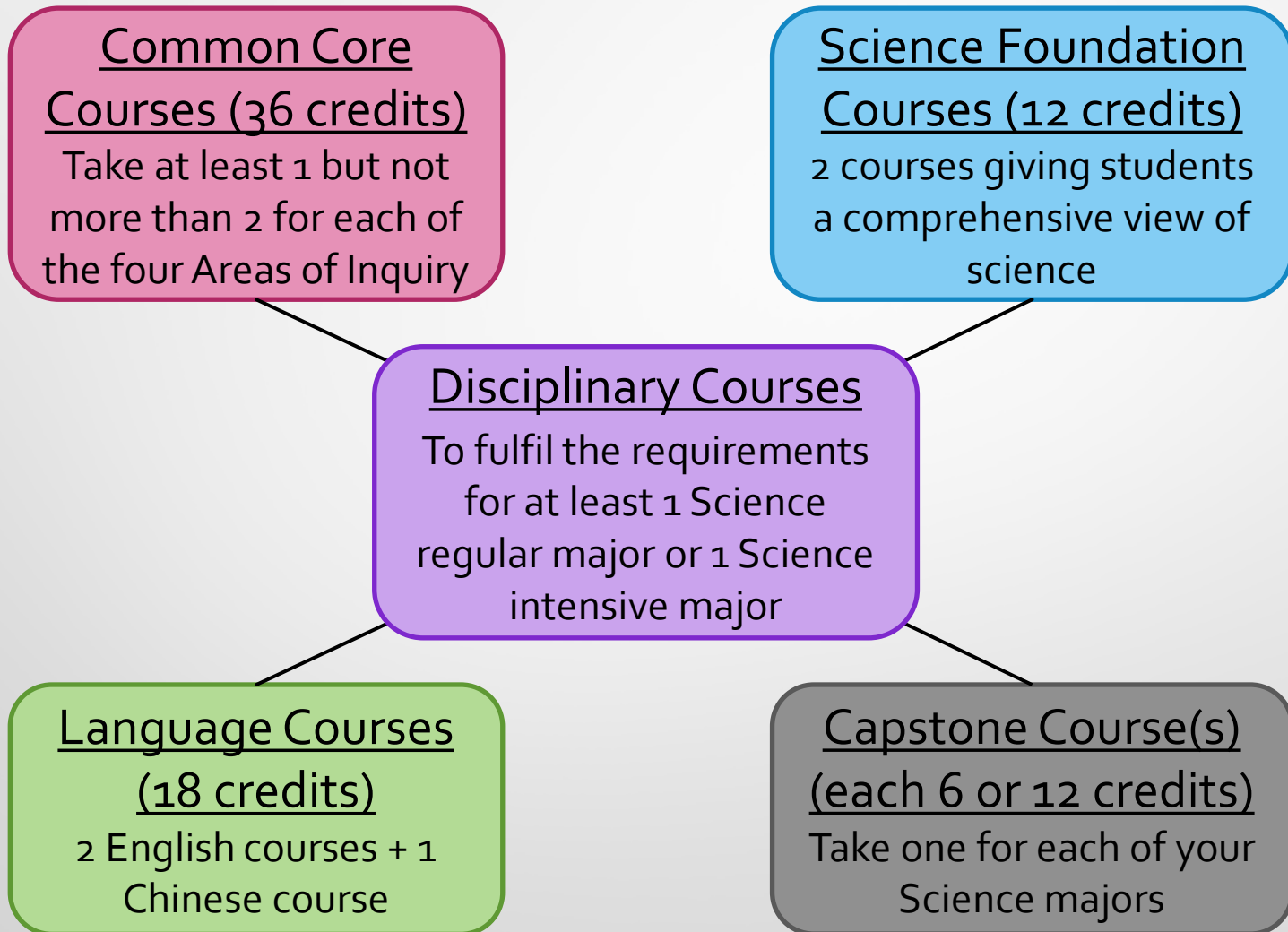
Dr. Judy Chow

Department of Physics, HKU

Use of this document

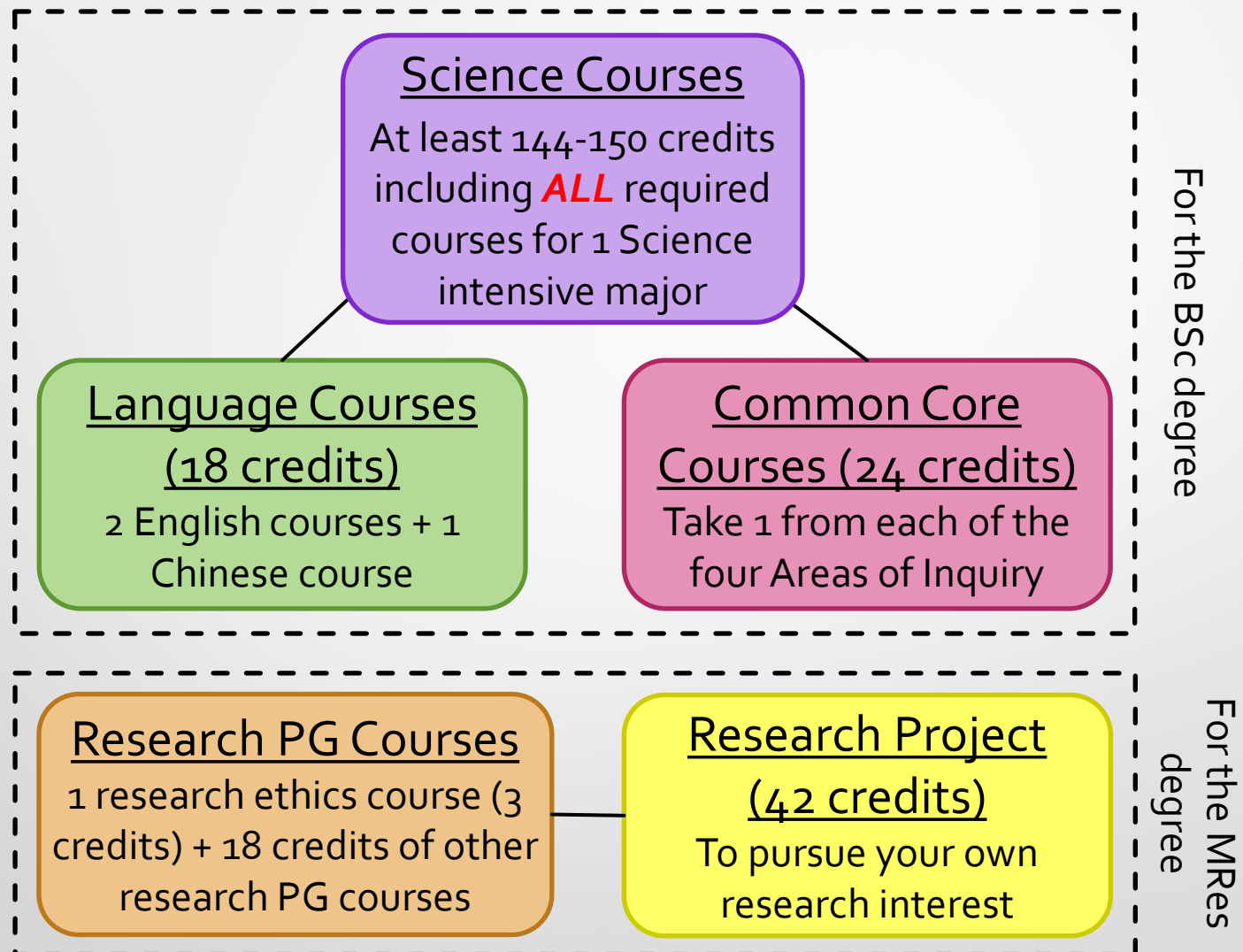
- This document provides basic information about course selection for students interested in majors/minors in physics.
- Students should check out the following pages for updated information about the syllabus
 - **Faculty of Science** <https://www.scifac.hku.hk/current>
 - **Department of Physics**
https://www.physics.hku.hk/undergraduate_studies/course_selection_guidelines/
- If you have any question, please contact your Academic Advisor or Course Selection Advisor for inquiries.
 - <https://www.scifac.hku.hk/current/ug/academic/aa>

BSc Curriculum Structure



Total credits passed: ≥ 240

BSc&MRes Curriculum Structure



Total credits passed for the BSc degree: ≥ 240

Total credits passed for the MRes degree: ≥ 63

BSc&LLB Curriculum Structure*

**For students admitted to the first year in 2024/25 and thereafter*

Science Courses

(96 credits)

ALL required courses for
1 Science regular major

Common Core

Courses (24 credits)

Take 1 from each of the
four Areas of Inquiry

LLB Professional Core

(156 credits)

108 credits of law compulsory
courses+30 credits of disciplinary
electives+12 credits of
interdisciplinary core courses + 6
credits of capstone

Interdisciplinary Electives

(12 credits)

Law & science interdiscip. electives
as prescribed in the syllabus

Language Courses

(12 credits)

1 English course + 1
Chinese course

Total credits passed: ≥ 300

Majors and Minors

- **Physics Major** (96 credits; 16 courses)
 - *Large flexibility* in curriculum, lead to diverse career paths
- **Physics Major (Intensive)** (144 credits; 24 courses)
 - *Comprehensive training* in physics, targeted for students who want to pursue Master or PhD in physics or other science/technical disciplines
- **Astronomy Minor** (36 credits; 6 courses)
 - Suitable for all students (BSc or non-BSc) interested in the subject
 - Minimum physics & mathematics background needed
- **Physics Minor** (42 credits; 7 courses)
 - Skills learnt in could be useful in many science and non-science fields (e.g., chemistry, economics and finance)

Physics Major

- Aim: Educating all-rounded physics students which best fit their interest and expertise
- Large flexibility in curriculum, lead to diverse career paths
- **Student-centered curriculum**
 - Learn the “**physics skill set**” first:
 - ✓ Mathematics, problem-solving, model-building, and computing
 - Follow with **core courses** for physics undergraduates:
 - ✓ Introductory level (Years 1 and 2): fully integrating usage of calculus and vectors; stress daily connections
 - ✓ Advanced level (Years 3 and 4): formal training in physics with more abstraction and advanced mathematics

Physics Major (Intensive)

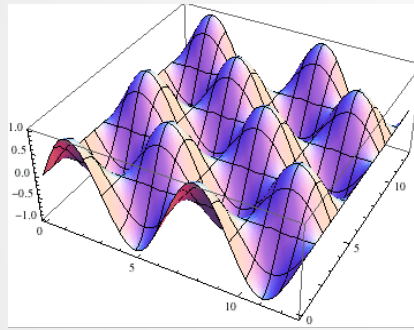
- Aim: Educating physics students with a solid foundation on the subject in both breath and depth
- *Targeted for students who want to pursue further studies in physics and other science/technical disciplines*
- **New curriculum structure** for students since 2018
 - All students who major in physics can select *either* the regular Major *or* the Intensive option
 - All required courses for the regular Major are included in the Intensive option
 - *No penalty* for students who cannot complete the Intensive option

Themes for Physics or Physics (Intensive) Majors

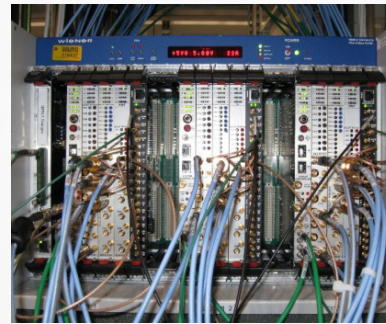
- *Optional* for students (may choose 0, 1, or 2 themes)



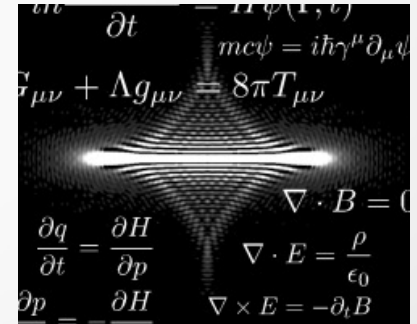
Astrophysics



**Computational
Physics**



**Experimental
Physics**



**Theoretical
Physics**

- Cluster of courses to **build expertise** in specific areas
- Capstone project related to the theme
- Enhanced training to prepare for postgraduate studies
- **Student strength endorsed** by the Department with certificate of completion

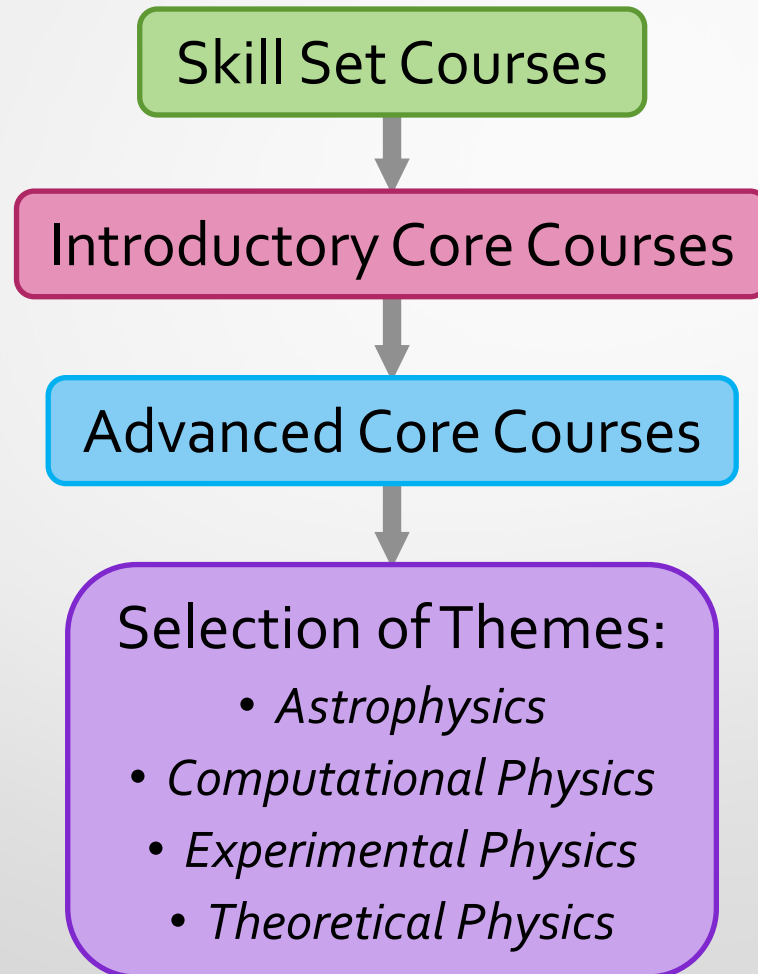
Capstone Requirement

- All HKU students need to complete capstone to graduate
- Students *had to fulfil the 24 credits advanced level core course requirement in the major before taking the capstone course*
- The *earliest* that students are allowed to take capstone course is their *year 3* of study
- Capstone courses offered by Physics Department:
 - **PHYS3999 Directed Studies in Physics** (6 credits; one semester; offered in both Semester 1 and 2)
 - **PHYS4966 Physics Internship** (6 credits; *offered in summer only*)
 - **PHYS4999 Physics Project** (12 credits; full year)

PHYS4966 Physics Internship

- **Requirement:** 8 weeks in academic and non-academic institutions overseas or locally during summer
- **Local research:** Spending summer to work with HKU professors
- **Overseas research:** UC Berkeley, Caltech, Cambridge, Harvard, Oxford, Stanford, RIKEN, CERN, ...
- **Local organizations:** HK Observatory, HK Space Museum, HK Science Museum, Ho Koon Nature Education cum Astronomical Centre, ...
- **Education:** Cheung Sha Wan Catholic Secondary School, St Francis of Assisi's College, Yu Chun Keung No 2 Memorial College, ...

Curriculum Structure for Physics or Physics (Intensive) Majors



Year 1&2 - Physics Major

Skill Set Courses

PHYS1150 Problem Solving in Phys*

PHYS2150 Method in Physics I*

PHYS2155 Method in Physics II*

PHYS2160 Intro Comp Phys*

+

Intro Core Courses

PHYS2055 Intro Relativity*

PHYS2250 Intro Mechanics

PHYS2255 Intro E & M

PHYS2261 Intro Heat & Thermo

PHYS2265 Intro Quan Phys

***Select 2 out of 5 (The others are required courses)**

Year 1&2 - Physics Major (Intensive)

Skill Set Courses

PHYS1150 Problem Solving in Phys

PHYS2150 Method in Physics I

PHYS2155 Method in Physics II

PHYS2160 Intro Comp Phys*

+

Intro Core Courses

PHYS2055 Intro Relativity

PHYS2250 Intro Mechanics

PHYS2255 Intro E & M

PHYS2261 Intro Heat & Thermo

PHYS2265 Intro Quan Phys

COMP1117 Computer Prog*

MATH1013 University Math II*

PHYS1650 Nature of the Universe*

PHYS2650 Modern Astro*

STAT1600 Statistics: Ideas &
Concepts*

***Select 2 out of 6 (The others are required courses)**

Minor in Astronomy

- Aim: Provide training on both observational and theoretical aspects, with *minimal physics and mathematics requirements*
- Suitable for both physics and non-physics major students
- **Large number of intro & advanced astrophysics courses** on offer
 - Introductory level courses (18 credits):
 - ✓ PHYS1650 Nature of the Universe
 - ✓ PHYS2650 Modern Astronomy
 - ✓ PHYS1250 Fundamental Physics *or* PHYS2055 Introductory Relativity *or* PHYS2160 Introductory Computational Physics *or* EASC2408 Planetary Geology
 - Advanced level courses (18 credits):
 - ✓ PHYS3650 Observational Astronomy
 - ✓ Any two advanced level astronomy electives

There are multiple ways to focus on studying astronomy in HKU.

- If I want to study astronomy in HKU, should I select the
 - **Minor in Astronomy?**
 - **Major in Physics (Intensive) with Astrophysics theme?**
 - **Major in Physics - Minor in Astronomy combination?**
- **Minor in Astronomy** is suitable for science or non-science students with minimal physics and math requirements
- If you want to pursue postgraduate research in astronomy/astrophysics, then choose EITHER **Major in Physics (Intensive) with Astrophysics theme** OR **Major in Physics - Minor in Astronomy combination**
- Slightly more restriction for the Major(intensive)+theme option (*a 4000-level course plus a project in astronomy*)

The flexible Minor in Physics curriculum provides a flavour of the discipline.

- Aim: Provide interested students with a fundamental outlook on the subject, with great flexibility to explore one's interest
- *Helpful* for study of other science or non-science disciplines
- **Flexible structure to cater to students' interest and ability**
 - ❖ Introductory level courses (24 credits):
 - ✓ PHYS 1250 Fundamental Physics
 - ✓ Any three intro level physics electives from PHYS1150, PHYS2055, PHYS2150, PHYS2155, PHYS2160, PHYS2250, PHYS2255, PHYS2261, PHYS2265
 - ❖ Advanced level courses (18 credits):
 - ✓ Any three advanced level physics courses

There are multiple pathways for students interested in BOTH physics and maths.

- If I want to study both physics and mathematics in HKU, should I select
 - Double major in Physics and Mathematics?
 - Major in Physics (Intensive) plus Minor in Mathematics?
 - Major in Mathematics (Intensive) plus Minor in Physics?
- Double major requires minimum of 192 credits while intensive major-minor combination requires minimum of 180 credits
- For double major, you need to complete two capstone courses (*exemption possible if project integrates or applies both majors*)
- More restriction on course selection for an intensive major; while a Minor provides only essential knowledge of subject
- At the end, the decision depends on a combination of your interest, ability, and career aspirations.

Points to Notes about Course Selections for Majors and Minors

- *Watch out for pre-requisite requirements*
- *Beware of timetable clash*
- The courses required for the Majors listed in the BSc syllabus is the *minimum*. Likely *need more* for research postgraduate studies. Ask your **Course Selection Advisor** for details.
- **Course Selection Road Map for students** are available on the website:

https://www.physics.hku.hk/undergraduate_studies/course_selection_guidelines/

Sample Major in Physics

Year 1&2 Curriculum (minimum)*

For students with

(1) HKDSE Physics **AND**

(2) HKDSE Extended Mathematics Module 1 **or** Module 2

	Semester 1	Semester 2
Year 1	PHYS1150 Problem Solving in Phys XXX XXX XXX XXX	PHYS2250 Intro Mechanics XXX XXX XXX XXX
Year 2	PHYS2150 Method in Physics I PHYS2261 Intro Heat & Thermo XXX XXX XXX	PHYS2255 Intro Elect & Magnetism PHYS2265 Intro Quantum Physics XXX XXX XXX

**For reference only, you should consult your course schedule with Course Selection Advisor.*

Sample Major in Physics

Year 1&2 Curriculum (minimum)*

For students with only HKDSE Physics

	Semester 1	Semester 2
Year 1	MATH1011 University Math I# PHYS1250 Fundamental Physics# XXX XXX XXX	PHYS1150 Problem Solving in Phys XXX XXX XXX XXX
Year 2	PHYS2150 Method in Physics I PHYS2250 Intro Mechanics PHYS2261 Intro Heat & Thermo XXX XXX	PHYS2255 Intro Elect & Magnetism PHYS2265 Intro Quantum Physics XXX XXX XXX

#These courses do not count towards the Major requirements.

**For reference only, you should consult your course schedule with Course Selection Advisor.*

Sample Major in Physics (Intensive)

Year 1 & 2 Curriculum*

For students with

(1) HKDSE Physics **AND**

(2) HKDSE Extended Mathematics Module 1 **or** Module 2

	Semester 1	Semester 2
Year 1	PHYS1150 Problem Solving in Phys PHYS1650^ <u>or</u> MATH1013^ <u>or</u> STAT1600^ <u>or</u> COMP1117^ XXX XXX XXX	PHYS2250 Intro Mechanics PHYS2055 Intro Relativity <u>or</u> PHYS2255 Intro Elect & Magnetism XXX XXX XXX
Year 2	PHYS2150 Method in Physics I PHYS2261 Intro Heat & Thermo PHYS2265 Intro Quantum Physics XXX XXX	PHYS2155 Method in Physics II PHYS2055 <u>or</u> PHYS2255 PHYS2160 Intro Comp Phys^ <u>or</u> PHYS2650 Modern Astro^ XXX XXX } Possibly 3000-level courses

^Select 2 out of 6

**For reference only, you should consult your course schedule with Course Selection Advisor.*

Sample Major in Physics (Intensive, Astro theme) Year 1&2 Curriculum

For students with

(1) HKDSE Physics **AND**

(2) HKDSE Extended Mathematics Module 1 **or** Module 2

	Semester 1	Semester 2
Year 1	PHYS1150 Problem Solving in Phys PHYS1650 Nature of the Universe XXX XXX XXX	PHYS2250 Intro Mechanics PHYS2055 Intro Relativity <u>or</u> PHYS2255 Intro Elect & Magnetism PHYS2650 Modern Astronomy XXX XXX
Year 2	PHYS2150 Method in Physics I PHYS2261 Intro Heat & Thermo PHYS2265 Intro Quantum Physics XXX XXX	PHYS2155 Method in Physics II PHYS2055 <u>or</u> PHYS2255 XXX XXX XXX <div> <i>Possibly 3000-level courses</i> </div>

****For reference only, you should consult your course schedule with Course Selection Advisor.***

Further Advice for Students Intended to Do Research after Graduation

- *Keep your eyes wide open* – learn more about different fields of physics
- *Learn about the surroundings* – find out more about modern physics research being done (check out Department webpage, attend colloquium, talk to teachers, etc)
- *Watch out for emails* – get on the email list of the department (if you incline to declare or have declared major); information about many learning programs are announced this way
- *Give it a try!* – the only way to find out whether you like or are capable to do research is to try doing it (e.g., informal research project during term time, summer research fellowship, etc)

Sample Study Path for BSc&MRes Students

[Sample A]

For studying within the normative study period

A. Sample study plan for studying within the normative study period								
	YEAR 1		YEAR 2		YEAR 3		YEAR 4	
	BSc	MRes	BSc	MRes	BSc	MRes	BSc	MRes
Semester 1	36	0	36	3	18	18	18	42 (research project)
Semester 2	36	0	36 (optional exchange study^)	0	30 (optional visiting study^)	0	18	
Summer Semester	0 (optional SRF^)	0	0 (optional ORF^)	0	12 (optional overseas summer study^)	0	0	
Total	72	0	72	3	60	18	36	42
	72		75		78		78	

Sample Study Path for BSc&MRes Students

[Sample B]

For top performing BSc students opt for BSc&MRes in Year 3

B. Sample study plan for top performing BSc students who opt for the BSc&MRes programme in Year 3						
	YEAR 1	YEAR 2	YEAR 3		YEAR 4	
	BSc	BSc	BSc	MRes	BSc	MRes
Semester 1	36	36	12	21	18	42 (research project)
Semester 2	36	36 (optional exchange study^)	36 (optional visiting study^)	0	18	
Summer Semester	0	0 (optional SRF/ORF^)	12 (optional overseas summer study^)	0	0	
Total	72	72	60	21	36	42
			81		78	

Note: A small number of top-performing BSc students in the 6901 BSc programme will have the opportunity to join this integrated programme under stringent criteria. Eligible BSc students can apply for opt in at the end of their Year 2 study. Eligibility includes having completed 144 credits, and achieved CGPA of 4.0 or above at the end of Year 2.

Sample Study Path for BSc&MRes Students

[Sample C]

For studying beyond the normative study period (in 4.5 years)

C. Sample study plan for students who study beyond the normative study period (completion of study in 4.5 years)										
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
	BSc	MRes	BSc	MRes	BSc	MRes	BSc	MRes	BSc	MRes
Semester 1	36	0	30	3	24	12	12	42 (research project)	30	6
Semester 2	30	0	36 (optional exchange study [^])	0	30 (optional visiting study [^])	0	12		-	-
Summer Semester	0 (optional SRF [^])	0	0	0	0 (optional ORF [^])	0	0		-	-
Total	66	0	66	3	54	12	24	42	30	6
	66		69		66		66		36	

Sample Study Path for BSc&MRes Students

[Sample D]

For studying beyond the normative study period (in 5 years)

D. Sample study plan for students who study beyond the normative study period (completion of study in 5 years)										
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
	BSc	MRes	BSc	MRes	BSc	MRes	BSc	MRes	BSc	MRes
Semester 1	30	0	30	3	24	6	24	6	12	42 (research project)
Semester 2	30	0	30 (optional exchange study^)	0	30 (optional visiting study^)	0	24	6	6	
Summer Semester	0 (optional SRF^)	0	0	0	0 (optional ORF^)	0	0	0	0	
Total	60	0	60	3	54	6	48	12	18	42
	60		63		60		60		60	

Sample Study Path for BSc&MRes Students

[Sample E]

For students switch back to BSc in Year 3 & graduate in 3.5 years

E. Sample study plan for students who switch back to BSc programme only in Year 3, and graduate in 3.5 years						
	YEAR 1		YEAR 2		YEAR 3	YEAR 4
	BSc	MRes	BSc	MRes	BSc	BSc
Semester 1	36	0	36	3	36	30
Semester 2	36	0	36 (optional exchange study^)	0	30 (optional visiting study^)	-
Summer Semester	0 (optional SRF^)	0	0 (optional ORF^)	0	0	-
Total	72	0	72	3	66	30

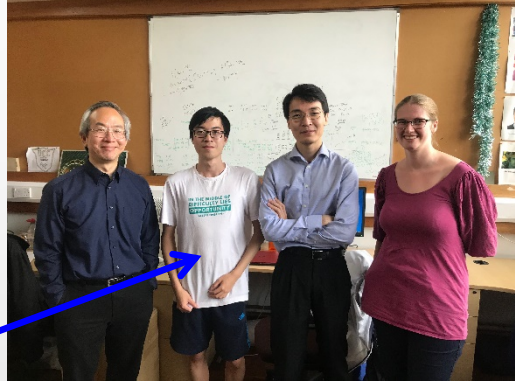
Summer Research Fellowship (SRF) Scheme (8-10 weeks during summer)

- Students work in the Faculty on a specific research project that **cater to their individual interest and ability**
- Award of a stipend of HK\$16,000 for their summer research work
- Students can find the list of openings and opportunities for ORF in Department of Physics at https://www.physics.hku.hk/undergraduate_studies/local_and_overseas_program/

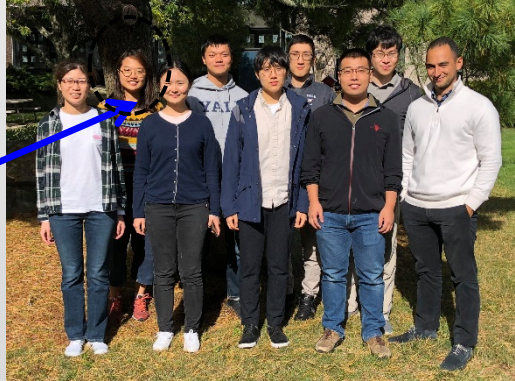
Overseas Research Fellowship (ORF) Scheme (8-10 weeks during summer)

- Participants engage in research fields of their own choice; Physics Department **match interest with researchers**
- Award of a stipend of HK\$16,000 and reimbursement of 80% of actual airfare and capped at HK\$12,000 in max


2019 summer



Marco Yeung (experimental nuclear physics) with Prof Shunji Nishimura, **RIKEN**



Kelvin Tsang (experimental particle physics) Prof Jeff Tseng, **Oxford Univ.**



Zhao Qingqing (computational condensed matter physics) Prof Owen Miller, **Yale Univ.**

Overseas Research Fellowship (ORF) Scheme (8-10 weeks during summer)

- Participants engage in research fields of their own choice;
Physics Department **match interest with researchers**
- Award of a stipend of HK\$16,000 and reimbursement of 80% of actual airfare and capped at HK\$12,000 in max
2023 summer



Adrian Law (Quantum Computing), **University of Toronto**

Overseas Research Fellowship (ORF) Scheme (8-10 weeks during summer)

- Participants engage in research fields of their own choice; Physics Department **match interest with researchers**
- Award of a stipend of HK\$16,000 and reimbursement of 80% of actual airfare and capped at HK\$12,000 in max **2023 summer**



Justin Chau (Particle Physics),
CERN



Eligibility for Applying SRF & ORF

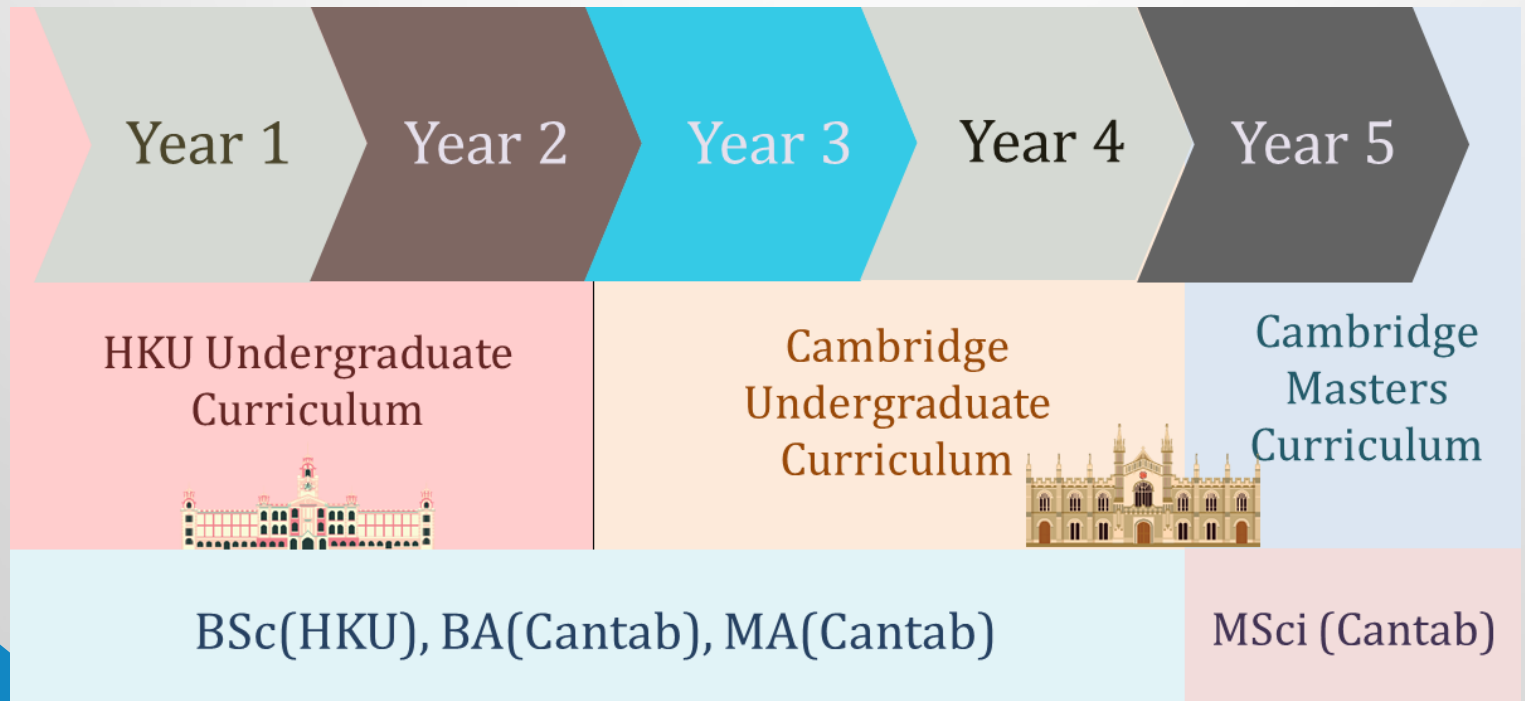
- Non-final year BSc, BSc&MRes, BSc&LLB, BSc(ActuarSc) and BSc(AppliedAI) students
- Recommendation of a prospective supervisor
- To better prepare students for conducting research, students who participated or will participate in SRF/ORF Scheme ***must take and pass SCNC3111***. Course description can be found at https://webapp.science.hku.hk/sr4/servlet/enquiry?Type=Course&course_code=SCNC3111
- Past participants of SRF/ORF Scheme CANNOT apply for the same fellowship scheme which they had previously participated

Young Scientist Scheme (YSS)

- YSS scheme provides outstanding students with ample early research experiences in 6901 and 6688.
- Students in YSS are guaranteed with:
 - Enrolment in SRF and/or ORF Scheme to conduct research under the supervision of our professors or in a foreign institution
 - International exchange, visiting or summer study
 - Research mentor and frontiers of science honours seminar
 - Stipends and entrance scholarships
- Details can be found at
<https://www.scifac.hku.hk/prospective/ug/6901-bsc/yss>

HKU-Cambridge Undergraduate Recruitment Scheme (Natural Science)

- Cambridge-track for **Selected YSS Participants** in Natural Sciences Disciplines that allows talented students to earn 3-4 degrees upon successful completion of 2 years of studies at HKU and 2-3 years of studies at Cambridge

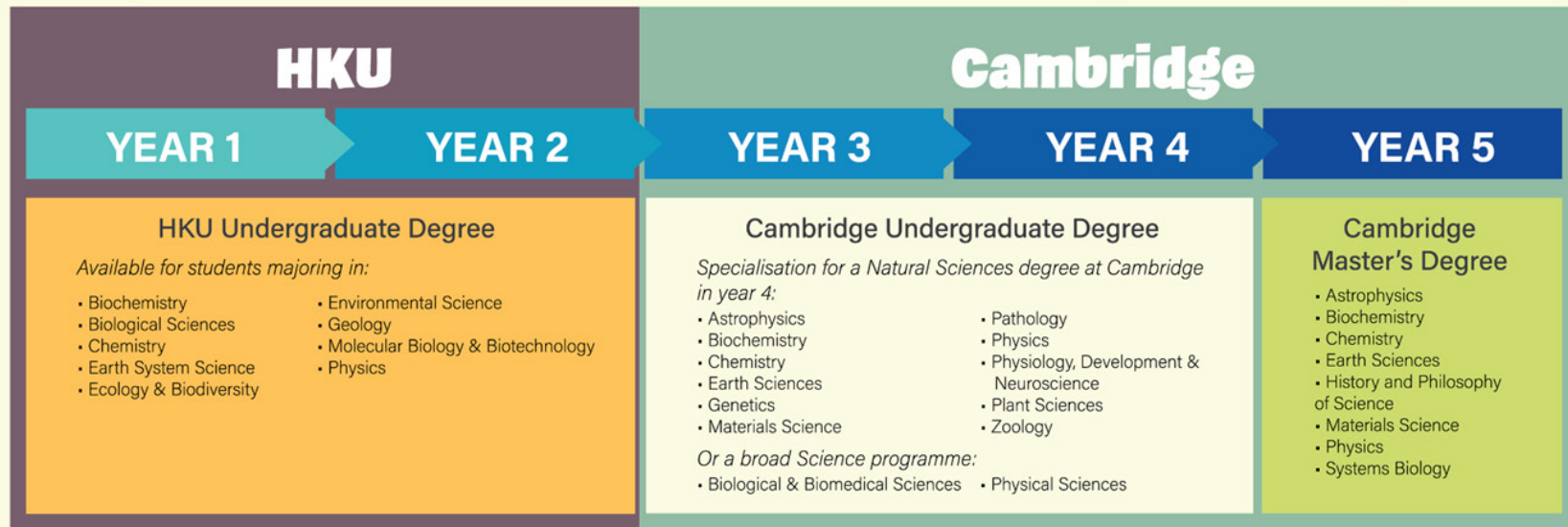


HKU-Cambridge Undergraduate Recruitment Scheme (Natural Science)

- Details can be found at

<https://www.scifac.hku.hk/prospective/ug/6901-bsc/yss/cambridge/introduction>

Study Path for YSS Students in the Cambridge Scheme (2+2+1) mode



Remarks:

- Students will study 3 science subjects in Year 3 to get prepared for the specialisation in Year 4.
- Students who do NOT opt for a Master's degree at Cambridge will take extra research internships at HKU to fulfill the University's graduation requirements.
- Students will pay HKU fees and Cambridge fees for their study at HKU and Cambridge, respectively.